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North Carolina Department of Transportation
Planning and Environmental Branch
Statewide Planning Group
Small Urban Planning Unit

TOWNS OF HERTFORD AND WINFALL

THOROUGHFARE PLAN



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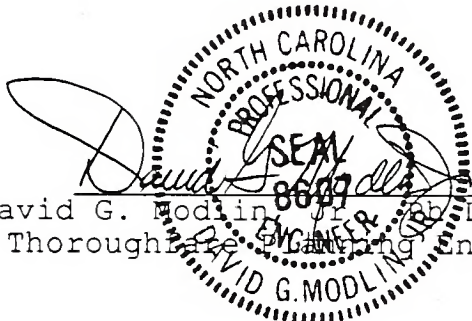


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THOROUGHFARE PLAN
FOR THE
TOWNS OF HERTFORD AND WINFALL

Prepared by the:
Statewide Planning Group
Planning and Environmental Branch
Division of Highways
North Carolina Department of Transportation

In Cooperation with:
The Town of Hertford
The Town of Winfall
The Federal Highway Administration
U.S. Department of Transportation


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I. INTRODUCTION

The Town of Hertford, incorporated since 1758, sits where the broad Perquimans River narrows to a stream and is the county seat. In earlier days, the Perquimans, Yeopim, and Little Rivers were tidal estuaries of the sound and brought river trade that paid off in commercial fishing. The area is a large farming region producing grain and livestock markets for the county's chief products. Hertford is the county seat today with London street names like Covent Garden, Punch Alley, and Hyde Park. The streets of comfortable old homes stretch inland or to the river bank. Cabins and a boat dock on Front Street provide accommodations for the growing number of fishermen who flock to Perquimans County for the year-round sport. Deer and small-game hunting is a favorite pastime of local sportsmen.

Across the river and about two miles north of Hertford is the Town of Winfall, the only other incorporated town in the county. Local tradition has it that Winfall got its name in 1775, when a big storm blew over the corner store. Northwest of Winfall on NC 37 is the Quaker Village of Belvidere, named for a handsome colonial estate which belonged to the Newby family. The house was built in 1767 and is now owned by Mr. and Mrs. Lloyd Chenowith. Belvidere was the home of a Quaker high school, one of the first in North Carolina.

The northeast corner of Perquimans County penetrates silent, brooding Dismal Swamp, uninhabited and rarely visited except by a few brave hunters. Whiteston and Parkville Communities huddle in the shadow of the swamp, and Chapanoke and Woodville lie south of or along the Pasquotank boundary. Heaviest concentration of rural population is on the peninsulas, Harvey's Neck and Durant's Neck, named for the most memorable families of pioneer days.

A few settlers had carved out their clearings in the wildness before 1661, the year in which George Durant made his famous land purchase from Chief Kilcocanen of the Yeopim Indians. Famous because it is the first record of a land transfer in North Carolina and because the white man actually paid the red man for his land. Durant played a central role in the rowdy years of Carolina's first settlement. In 1672, Albemarle was divided into four precincts of which Perquimans was one. A geographic location map is shown in Figure 1.

Settlement of the Perquimans and Little River area took a slower pace than pleased the Lord Proprietors, who dreamed of an unbroken string of plantations and ports from Jamestown to Charleston. They offered land grants and printed fantastic promotional booklets to encourage emigration. But despite their efforts, the precinct developed slowly.

In 1701, a "Gran Courthouse" was built on the banks of Little River, but burned within the year. A courthouse was

constructed on Phelps Point in 1732, and a town slowly grew around it. Phelps Point was incorporated as Hertford in 1758. The name honored the Earl of Hertford, an Englishman who later proved friendly to the cause of American liberty.

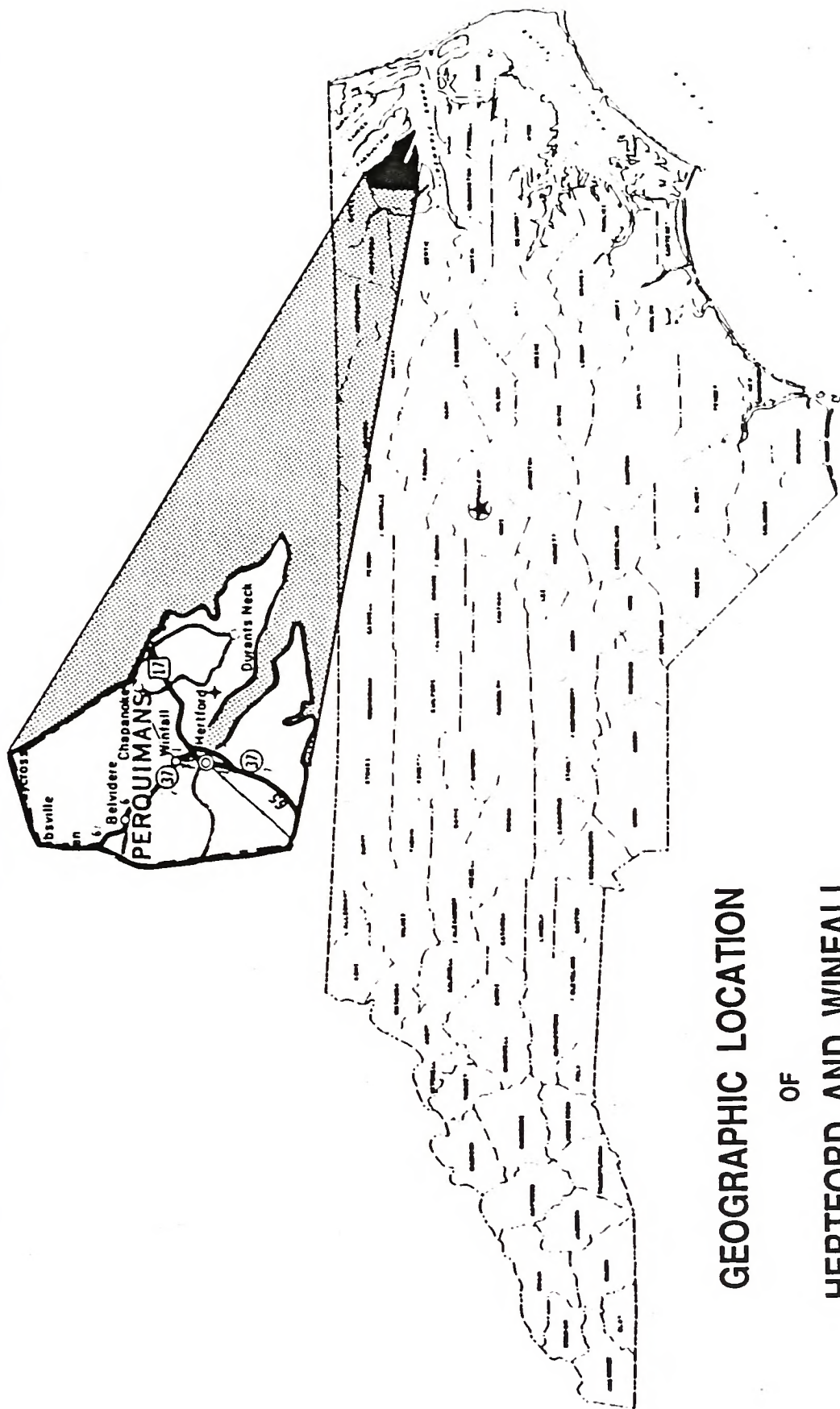
After the Revolutionary War, the planters of Perquimans settled down to the business of becoming prosperous. Farming thrived and trade was vigorous enough to keep 10 warehouses in business. In 1840, the county produced 370,000 bushels of corn, 35,500 bushels of wheat, 65,216 pounds of cotton and 9,100 barrels of fish, plus some oats and wool. Development after the Civil War was hindered by the almost total lack of an adequate transportation system. Until 1907, the only way to get to Raleigh was by boat across Albemarle Sound to Norfolk, Virginia, and thence by train. The first yard of paved road was laid in 1921; and in 1925, US 17, the "Ocean Highway", lifted Perquimans out of its long era of isolation.

In September 1990, the Town of Hertford asked the North Carolina Department of Transportation to review their highway system and develop a thoroughfare plan for the area. Later, because of its proximity to Hertford, Winfall asked to be included in the study. The Towns of Hertford and Winfall officially adopted a thoroughfare plan, June 10, 1991 and August 12, 1991, respectively. The North Carolina Board of Transportation followed by approving and adopting the plan on October 11, 1991.

This plan takes into account the concerns of the Town of Hertford and the Town of Winfall in addressing the patterns of future growth. The principles of basic thoroughfare planning, as described in Chapter II, were used to develop this thoroughfare plan. It is based on very general traffic, population, and land use data. Year 2015 average daily traffic projections were used to determine capacity deficiencies. Major and minor thoroughfares were located based on field investigations, existing and anticipated land uses, and topographic conditions.

It should be emphasized that the recommended plan is based on anticipated growth of the urban area as currently perceived. Prior to construction of specific projects, a more detailed study will be required to reconsider development trends and to determine specific locations and design requirements.

The purpose of this report is to document the study findings and recommendations. Included are recommendations for thoroughfare cross-sections, cost estimates for recommended improvements, benefits evaluations of recommended improvements, and plan implementation recommendations.



**GEOGRAPHIC LOCATION
OF
HERTFORD AND WINFALL
PERQUIMANS COUNTY
NORTH CAROLINA**

FIGURE 1

II. THOROUGHFARE PLANNING PRINCIPLES

Objectives

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and it helps eliminate unnecessary improvements, so needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population, commercial, and industrial development affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

1. providing for the orderly development of an adequate major street system as land development occurs,
2. reducing travel and transportation costs,
3. reducing the cost of major street improvements to the public through the coordination of the street system with private action,
4. enabling private interests to plan their actions, improvements, and development with full knowledge of public intent,
5. minimizing disruption and displacement of people and businesses through long range advance planning for major street improvements,
6. reducing environmental impacts, such as air pollution, resulting from transportation, and
7. increasing travel safety.

Thoroughfare planning objectives are achieved through both improving the operational efficiency of thoroughfares, and improving the system efficiency through system coordination and layout.

Operational Efficiency

A street's operational efficiency is improved by increasing the capability of the street to carry more vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined by the maximum number of vehicles which can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include street widening, intersection improvements, improving vertical and horizontal alignment, and eliminating roadside obstacles. For example, widening of a street from two to four lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. Impedances to traffic flow caused by slow moving or turning vehicles and the adverse effects of horizontal and vertical alignments are thus reduced.

Operational ways to improve street capacity include:

1. Control of access -- A roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane width and number.
2. Parking removal -- Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.
3. One-way operation -- The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.
4. Reversible lanes -- Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.
5. Signal phasing and coordination -- Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

1. Encourage people to form carpools and vanpools for journeys to work and other trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.
2. Encourage the use of transit and bicycle modes.
3. Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for employees. This will spread peak travel over a longer time period and thus reduce peak hour demand.
4. Plan and encourage land use development or redevelopment in a more travel efficient manner.

System Efficiency

Another means for altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost to the user. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Functional Classification

Streets perform two primary functions -- traffic service and land service, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely used abutting property leads to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease, and safety. Different streets in the system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict. Streets are categorized as to function as local access streets, minor thoroughfares, or major thoroughfares (See Figure 2).

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations of the streets would be served. Local streets may be further classified as either residential, commercial, and/or industrial depending upon the type of land use which they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets which comprise the major thoroughfare system may also serve abutting property, however, their principle function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and an impediment to traffic flow. Major thoroughfares may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system which is most adaptable to desired lines of travel within an urban area is the radial-loop system. It permits movement between various areas of the city within maximum directness. This system consists of several functional elements--radial streets, crosstown streets, loop system streets, and bypasses (Figure 2).

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of crosstown streets which form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other side to follow the area's border. It also allows central area traffic to circle and then enter the area near a given destination. The effect of a good crosstown system is to free the central area of crosstown traffic, thus permitting the central area to function more adequately in its role as a business or pedestrian shopping area.

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not

IDEALIZED THOROUGHFARE PLAN

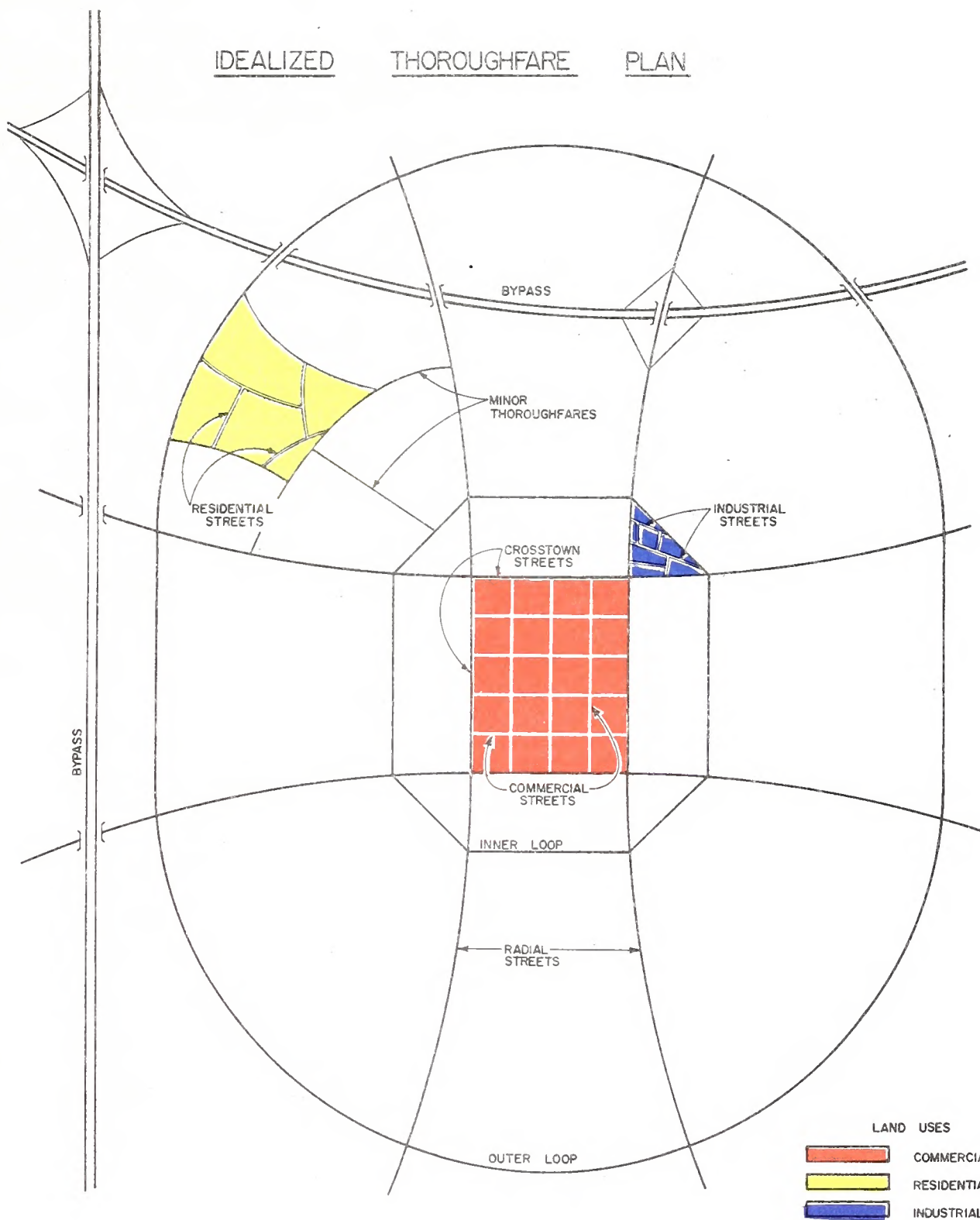


FIGURE 2

necessarily carry heavy volumes of traffic, but they function to help relieve central areas. There may be one or more loops, depending on the size of the urban area. They are generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A **Bypass** is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing traffic which has no desire to be in the city. Bypasses are usually designed to through-highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Application of Thoroughfare Planning Principles:

The concepts presented in the discussion of operational efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, a thoroughfare plan is developed for established urban areas and is constrained by the existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these constraints and the many other factors that affect major street locations.

III. EXISTING FACILITIES

Major Routes

The primary routes serving Hertford and Winfall are US 17 Bypass, US 17 Business, and NC 37. The Towns are also served by several secondary road routes running mostly east and west. US 17 Bypass lies east of the Towns and is programmed (R-2208) to be widened to a four lane divided facility with a new structure over the Perquimans River with construction beginning in July, 1991.

The major highway links between Hertford and Winfall are NC 37 and US 17 Business. Other streets are generally residential or commercially oriented, with commercial development primarily in downtown Hertford and along US 17 Business. All routes in Hertford and Winfall are currently two lane. US 17 Business (Edenton Street) has been restriped as a three lane facility through the commercial district. Downtown Hertford has parallel parking on both sides of Church Street through the commercial district.

Population Trends

Travel is directly related to population although in Hertford and Winfall a large percentage of travel originates outside the immediate area on US 17 Bypass for pleasure and manufacturing jobs in Virginia, Elizabeth City, and the outer banks of North Carolina. Population trends and projections for Hertford and Winfall, and Perquimans County are shown in Table 1 below. Also, Perquimans County township trends are shown in Table 2.

TABLE 1

Population Trends and Projections			
Year	Perquimans Co.	Hertford	Winfall
1960	9,178	2,068	269
1970	8,351	2,023	581
1980	9,486	1,941	634
1990	10,447	2,105	501
2000	11,392 ¹	2,295 ²	546 ²
2010	12,176 ¹	2,453 ²	584 ²
2015	12,490 ¹	2,517 ²	600 ²
2020	12,845 ¹	2,588 ²	616 ²

¹Projections for Perquimans County taken from Office of State Planning, State of North Carolina, 1991.

²Hertford and Winfall projections assumed the same rate of percentage in population as Perquimans County, and does not take into account future annexations or the potential for enhanced growth in Winfall should water and sewer services become available.

Table 2

Perquimans County Township Trends				
Year	1960	1970	1980	1990
Belvidere	1402	1265	1301	1219
Bethel	898	851	1515	2455
Hertford	3111	2763	2580	2599
New Hope	1720	1636	2026	2337
Parkville	2047	1836	2064	1837
Totals	9178	8351	9486	10,447

As shown in Table 1, rapid increase in Hertford and Winfall population is not expected. However, traffic in and through the urbanized area will continue to grow over the next thirty years. US 17 Bypass improvement will be able to handle additional industrial development and through traffic through the planning period. The downtown area will have congestion problems if alternative routes are not planned for and constructed.

Economy and Employment

The Town of Hertford is considered the retail center of Perquimans County. The majority of retail trade occurs in the Hertford's central business district and shopping centers. Winfall has no appreciable commercial or business district. Since Hertford's population is less than 5,000, no detailed information on the economy is available. Therefore, economic information for Perquimans County provides the basis for an analysis of the Town's economy.

Estimates provided by the North Carolina Employment Security Commission show a slight increase in Perquimans County employment over the past 10 years. Even more significant is the dramatic decrease in agriculture employment. Agriculture employment has decreased by 48% from 1974 to 1984. In addition, the percentage of agriculture employment to non-agriculture employment has decreased significantly. The decline in agricultural employment is part of a nationwide trend toward mechanization and fewer family-owned farms. The larger employer of non-agricultural are the Don Juan Shirt Company and Truax Veneer Company offering employment to approximately 150 of the town's citizens. According to 1990 Census information, a large number of the County's residents are commuting to the Tidewater area for jobs in manufacturing. Thus, the County is losing more workers from out-commuting than gaining from in-commuting.

Travel Demand

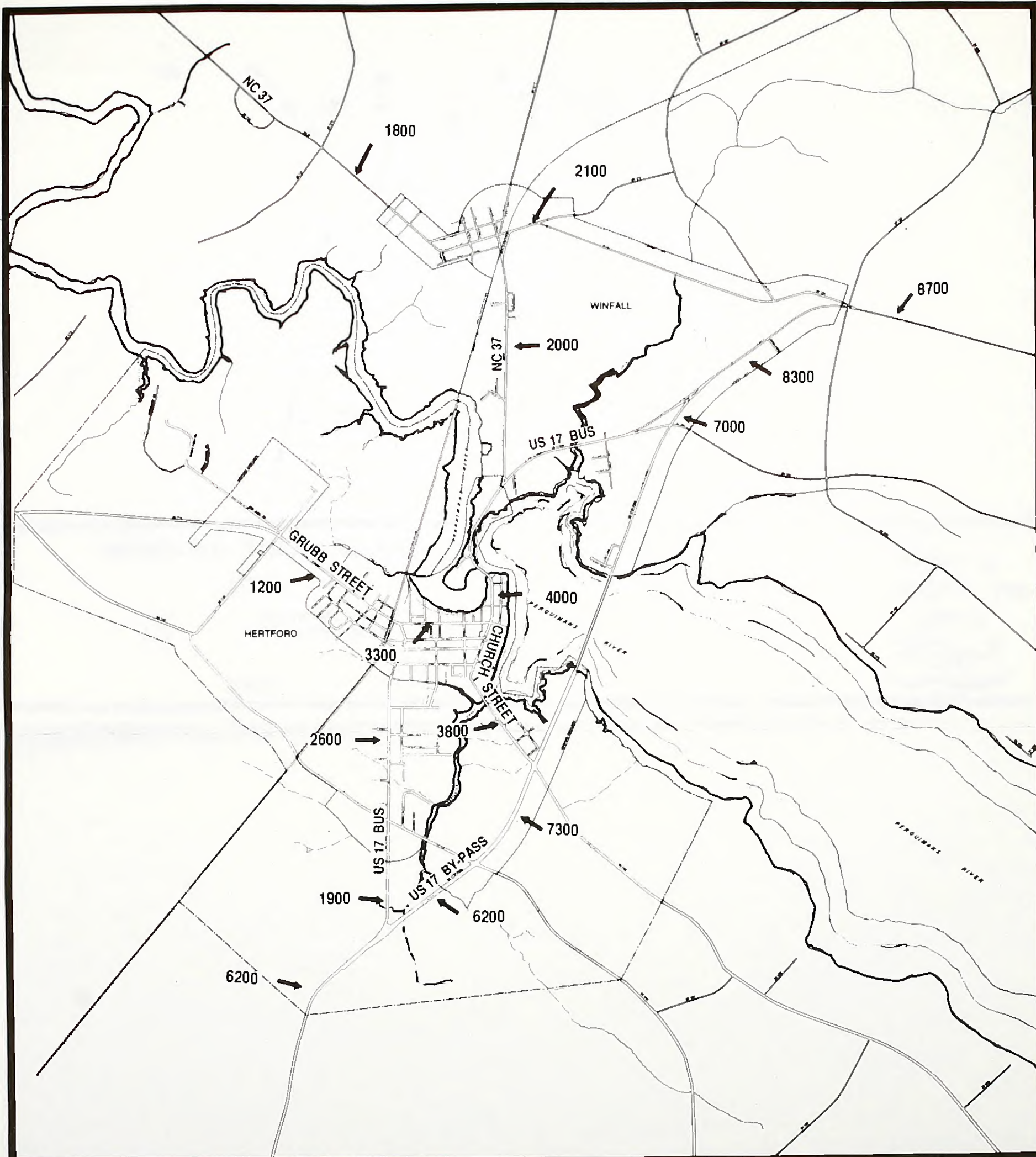
Travel demand is generally reported in the form of average daily traffic counts. Traffic counts are taken regularly at several locations in and around Hertford and Winfall by the North Carolina Department of Transportation. To estimate future travel demand, traffic trends over the past twenty years were studied.

A comparison of annual growth rates from 1983 to 1990 at various count locations in Hertford and Winfall shows average annual growth rates ranging from 0% to 5%. The largest growth was noted on US 17 Bypass and US 17 Business. Appendix A and Figures 2 and 3 show existing and expected average traffic volumes based on growth rates of 2.5% (moderate growth) to 3.5% (high growth). The reason this is used instead of the past growth rates is because these projections are being made for twenty-five and thirty years. It is very difficult for an area to sustain a annual growth rate over four percent. Likewise, it is uncommon for an area to maintain a growth rate less than two percent.

Traffic Accidents

Traffic accident analysis is a serious and important consideration in a thoroughfare plan development. The source of traffic accidents can be broken down into three general categories. The first is the physical environment which includes such things as road condition, weather, road obstructions, and traffic conditions. The second source is associated with the driver. This includes the driver's mental alertness, distractions in the car, ability to handle the vehicle, and reaction time. The third source is associated with the physical attributes of the vehicle itself. This would include such things as the condition of the brakes and tires, vehicle responsiveness, size of the vehicle, and how well the windshield wipers and defroster work. All traffic accidents can be attributed to one or more of these sources; however, the driver is often the primary source.

Accident data for March 1989 through March 1991 was studied as part of the development of this report. There were no major accident problems in the Hertford and Winfall area. The largest accident count for a single intersection in Hertford and Winfall was found on US 17 Bypass at its intersection with Church Street. Sight distance problem was the major cause of accidents that intersected with US 17. However, the four laning of US 17 with improved crossovers and signals, will improve the accident ratio. See Table 3 below for accident trends and location as to the most significant in the area.



1990 TRAFFIC COUNTS

LEGEND

0000 → 1990 ADT

TOWNS OF
HERTFORD AND
WINFALL

PERQUIMANS COUNTY

FIGURE 3

PROJECTED TRAFFIC COUNTS

LEGEND

2015
2020

PROJECTED ADT	PROJECTED ADT
---------------	---------------

FIGURE 4

LEGEND

THOROUGHFARES:

EXISTING	PROPOSED
----------	----------

MAJOR

000000

LINDA

TOWNS OF
HERTFORD AND
WINFALL

PERQUIMANS COUNTY
NORTH CAROLINA

JUNE 10, 1961

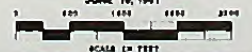


TABLE 3

Hertford and Winfall Selected Accident Inventory (March 1989 - March 1991)	
Location	Number of Accidents
US 17 Bypass @ Church Street	9
US 17 Bypass @ NC 37	7
US 17 Bypass @ SR 1300	7
Church Street @ Grubb Street	5

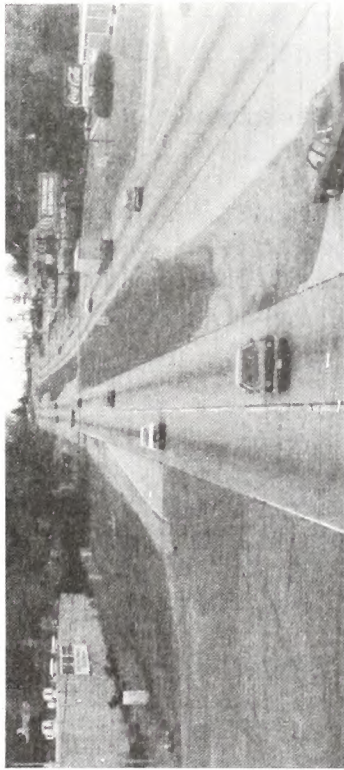
Capacity Analysis

A good indication of the adequacy of the existing major street system is a comparison of the traffic volumes with the ability of the streets to move traffic freely at a desirable speed. The ability of a street to move traffic freely, safely, and efficiently with a minimum delay is controlled principally by the spacing of signs or traffic signals utilized. Thus, the ability of a street to move traffic can be increased by restricting parking and turning movements, using proper sign and signal devices, and by the application of other traffic engineering techniques.

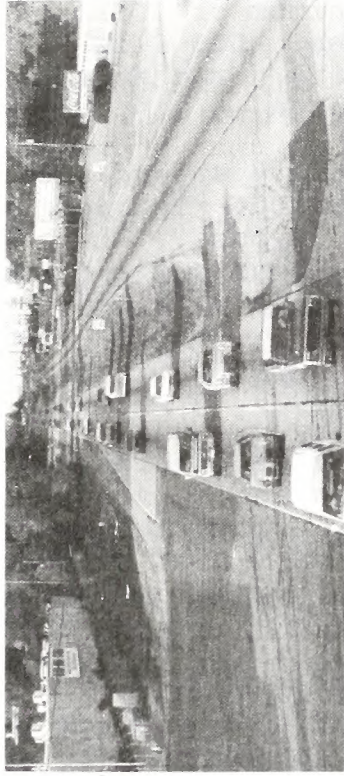
Capacity is defined as the maximum number of vehicles which has a reasonable expectation of passing over a given section of a roadway in one direction, or in both directions, during a given time period under prevailing roadway and traffic conditions.² The relationship of traffic volumes to the capacity of the roadway will determine **level of service** being provided. Six levels of service have been selected to identify the conditions existing under various speed and volume conditions on a highway or street.

The six levels of service are illustrated in Figure 5, and they are defined on the following pages. The definitions are general and conceptual in nature, but may be applied to urban arterial level of services. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them. Each chapter of the 1985 Highway Capacity Manual contains more detailed descriptions of the levels of service as defined for each facility type.

1. **Level-of-service A** describes primarily free flow-operations at average travel speeds usually about 90 percent of the free flow speed for the arterial class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.
2. **Level-of-service B** represents reasonable unimpeded operations at average travel speeds usually about 70 percent of the free flow speed for the arterial class. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tension.
3. **Level-of-service C** represents stable operations. However, ability to maneuver and change lanes in midblock locations may be more restricted than in LOS B, and longer queues and/or adverse signal coordinations may contribute to lower average travel speeds of about 50 percent of the average free flow speed for the arterial class. Motorists will experience an appreciable tension while driving.
4. **Level-of-service D** borders on a range on which small increases in flow may cause substantial increases in approach delay and, hence, decreases in arterial speed. They may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free flow speed.
5. **Level-of-service E** is characterized by significant approach delays and average travel speeds of one-third the free flow speed or lower. Such operations are caused by some combination of adverse progression, high signal density, extensive queuing at critical intersections, and inappropriate signal timing.
6. **Level-of-service F** characterizes arterial flow at extremely low speeds below one-third to one-quarter of the free flow speed. Intersection congestion is likely at critical signalized locations, with high approach delays resulting. Adverse progression is frequently a contributor to this condition.



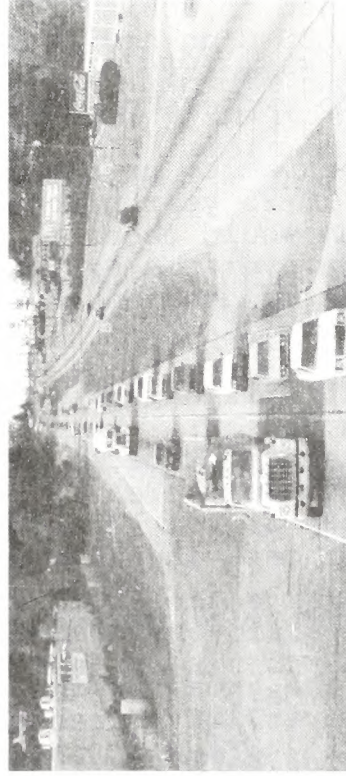
LEVEL OF SERVICE - A



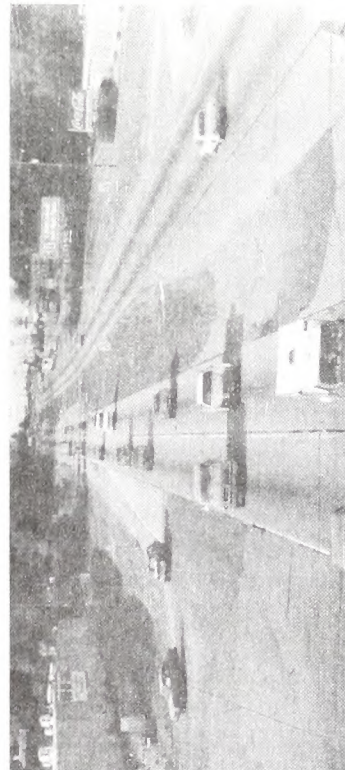
LEVEL OF SERVICE - D



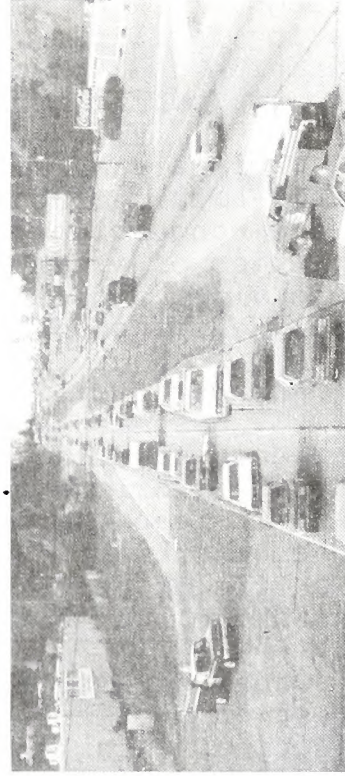
LEVEL OF SERVICE - B



LEVEL OF SERVICE - E



LEVEL OF SERVICE - C



LEVEL OF SERVICE - F

LEVELS OF SERVICE

FIGURE 5

The recommended improvements and overall design of the Thoroughfare Plan were based on achieving a minimum of LOS D on existing facilities, and LOS C on new facilities. LOS D is considered the "**practical capacity**" of a facility, or that at which the public begins to express dissatisfaction.

There are no severe capacity problems in the Hertford and Winfall area through the 20-25 year planning period. The most notable congestion problem would occur on US 17 Bypass. With the completion of a new bridge over the Perquimans River and a four lane divided facility, the congestion on the bypass will be totally eliminated.

Another facility that will experience problems in the future is US 17 Business (Church Street). This facility will not experience capacity problems but mostly maintenance problems of the current bridge and causeway. Yearly maintenance is significant to keep the causeway travel lanes open. Accordingly to the Bridge Department's latest data sheet, the Church Street bridge has a life of approximately 5 years. Of course, with continuous maintenance, the bridge life will be extended.

Other facilities in the area are not expected to have congestion problems. However, it is recommended that many of the facilities, with less than 24 feet of pavement, be widened to allow for 12 foot lanes.

IV. RECOMMENDATIONS

The following is a list of roads that are recommended to serve as major and minor thoroughfares as discussed in Chapter II. A brief discussion of each road's deficiencies and function is included to support its classification as a thoroughfare. More detail on physical and operational characteristics is given in Appendix A, Table 7.

There are many 2-lane facilities in the area that are less than 24 feet wide (12 foot lanes). It is desirable from an operations and safety standpoint that roads with less than 24 feet of pavement be widened to 24 feet. These facilities are also given in Appendix A, Table 7.

Major Thoroughfares

Existing major thoroughfares include:

US 17 Bypass - US 17 Bypass is a two lane facility that bypasses the central business district of Hertford and Winfall to the east and is part of the State of North Carolina's Intrastate Highway System. Widening of US 17 Bypass from a two lane to a four lane divided cross-section (TIP Project R-2208) is underway at this writing, including a new bridge over the Perquimans River. Improvement of this facility as a Hertford and Winfall Bypass and as a part of the State's Intrastate System will eliminate capacity problems during the 25 year transportation planning period as a Hertford-Winfall Bypass (see Figure 7, Appendix A, for cross sections).

US 17 Business - This two lane facility is one of the main facilities serving the Hertford downtown shopping area. It also serves other major shopping areas outside the downtown area. Parking along US 17 Business in the downtown area will lower the capacity of this facility. By removing parking and adding additional travel lanes, congestion problems in the downtown area could be alleviated in the future.

Edenton Road section of US 17 Business from SR 1107 to Dobb Street is currently a three lane cross section (centerlane for left turns). By providing a center turn lane, capacity for this section has been increased considerably. Capacity of other sections of US 17 Business may be increased significantly if the Town of Hertford passes an ordinance prohibiting parking in the sections of US 17 Business that may be designated for future three lanes.

US 17 Business (Dobb Street) is wide enough to accommodate a center turn lane for additional capacity when needed. Existing conditions allow for parking on one side of Dobb Street.

US 17 Business (Church Street) - From downtown Hertford to the Bypass consists of a two lane facility over the Perquimans River by way of a drawbridge and the causeway. Improvement to the bridge and the causeway is a high priority project for the Town of Hertford and for the Town of Winfall since it is the most direct link between the two Towns.

SR 1107-SR 1338 - These secondary roads run south of Hertford and serve the rural and residential abutting properties near the southern edge of the planning jurisdiction. There are no foreseeable capacity problems along these facilities.

SR 1110 (Center Hill Highway and Grubb Street) - This secondary road serves an area west of Hertford and is the major western route into the central business district of Hertford as it changes to Grubb Street. There are no foreseeable capacity problems along this route.

NC 37 - NC 37 from Winfall to US 17 Business is the major north-south link between Hertford and Winfall. It is a two lane facility with no expected capacity problems in the future. However, an improvement to the facility as it intersects Main Street in Winfall and to US 17 Business is recommended.

SR 1336 (Church Street) - This facility serves the southern rural area of Hertford and is the major intersection with US 17 Bypass. There are no capacity problems on this facility but it should be widened to twenty-four feet south of US 17 Bypass; and north of the bypass is recommended to be widened to a curb and gutter section and tied into the existing section as it approaches Castleton Creek.

SR 1300 - There are no foreseeable capacity problems on this facility in the future. It is recommended, however, that pavement be widened to 12-foot lanes.

SR 1301-SR 1227 - These secondary roads serve the rural communities east of Winfall. There are no foreseeable capacity problems on this facility in the future. It is recommended, however, that they be widened to 12-foot lanes.

SR 1219-SR 1221 - These facilities serve the rural area west and north of Winfall and into the town. There are no foreseeable capacity problems on this facility in the future.

SR 1218 (Desert Road) - This secondary road serves the rural community north of Winfall. There are no foreseeable capacity problems on this facility in the future. However, it is recommended that they be widened to 12-foot lanes.



FIGURE 6

ADOPTED BY TOWN OF HERTFORD JUNE 10, 1991
 ADOPTED BY TOWN OF WINFALL AUGUST 12, 1991
 RECOMMENDED FOR APPROVAL BY *Mr. R. Hill*
 PLANNING AND ENVIRONMENTAL BRANCH AUGUST 13, 1991
 ADOPTED BY N.C. DEPARTMENT OCTOBER 11, 1991
 OF TRANSPORTATION
 PUBLIC HEARING MAY 20, 1991

LEGEND		
THOROUGHFARES:	EXISTING	PROPOSED
MAJOR		
MINOR		

THOROUGHFARE PLAN
 TOWNS OF
 HERTFORD AND
 WINFALL
 PERQUIMANS COUNTY
 NORTH CAROLINA
 JUNE 10, 1991
 0 1000 2000
 SCALE IN FEET

Proposed new or improved major thoroughfares include:

US 17 Bypass - Widening of the bypass and a new bridge over the Perquimans River as part of the State's Intrastate System will expedite the movement of through traffic and will improve overall traffic conditions within the towns. Upon completion, there will be no capacity problems on this facility throughout the planning period.

US 17 Business - US 17 Business (Church Street) to the draw bridge and across the causeway is a substandard two lane facility. The bridge and causeway are in constant need of maintenance. Improvement to the bridge and stabilizing the causeway is the top priority project for the towns.

Concerns: The Towns of Hertford and Winfall approved the thoroughfare plan with the existing alignment of the bridge and the causeway. It is the opinion of the Statewide Planning Staff that the bridge should be replaced from downtown Hertford to NC 37 toward Winfall in a more direct line (eliminating the "s" curve) and for the bridge to carry the entire body of water eliminating the causeway. The height of the proposed bridge should be similar to the bypass bridge in order to accommodate local fishing boats.

NC 37 Proposal - This new facility lies between Winfall and US 17 Business and will access land that is inaccessible at the present time. This proposed route will be a more direct routing for NC 37. Also, its intersection with US 17 Bypass and SR 1300 near the present location of the US 17 Business and Bypass would be a much improved intersection. It is recommended that this proposal be built to a standard two-lane, 24-foot rural facility.

NC 37 / US 17 Business Intersection - It is recommended that this intersection be improved as shown on the thoroughfare plan for safety and site distance.

US 17 Business Intersection Alignment with US 17 Bypass -When the NC 37 proposal is completed, it is recommended that the existing US 17 Business intersection with the bypass be improved at the location as shown on the thoroughfare plan.

River Street Extension - The extension of River Street south from Winfall then crossing the Perquimans River gives access to land that is inaccessible at this time. This proposal intersects with Don Juan Road near the western boundary of Hertford corporate limits. It is recommended that this facility be built as a standard two-lane, 24-foot facility.

SR 1121 Extension - This extension lies further west than the River Street Extension, and also opens up new land for future development. It also crossed the Perquimans River then extends southerly near the Bryan Center facilities and then intersects with SR 1110. It is recommended that this facility be built to a standard two-lane, 24-foot section.

Intersection Improvement of NC 37 at SR 1219 (Winfall) - It is recommended that the existing NC 37 route be improved at its intersection with SR 1219 in Winfall near the vicinity of the post office as shown on the mutually adopted thoroughfare plan.

Bridge Improvement / Castleton Creek / Church Street - It is recommended that the bridge over Castleton Creek on Church Street be raised to accommodate local fishing boats when the time comes for either improvement to the bridge or an improvement to Church Street.

Minor Thoroughfares

Existing minor thoroughfares include:

SR 1337 (Skinner Street), SR 1108, Don Juan Road, Market Street, King Street (Hertford), River Street, King Street (Winfall), SR 1214 (Lake Road), and Dobb Street (from Grubb to Edenton) - These are two lane facilities that collect traffic from local access streets and feed traffic into the major thoroughfares. There are no foreseeable capacity problems on these facilities during the planning period.

There are no proposed minor thoroughfares for Hertford or Winfall. The facilities designated as minor thoroughfare are adequate to serve the area by getting traffic to the major thoroughfares.

Construction Improvements and Cost Estimates

Construction priorities will vary depending on what criteria are considered and what weight is attached to the various criteria. Most people would agree that improvements to the major thoroughfare system and major traffic routes would be more important than minor thoroughfares where traffic volumes are lower. To be in the States Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment.

Project user benefits include cost savings resulting from reductions in vehicle operating costs, travel time costs, and accident costs. Estimation of project environmental impacts is one of the more difficult evaluations. Environmental factors

usually considered can be divided into three major categories--- physical, social, and/or cultural, and economic environmental considerations (see Table 4). Many of these are accounted for when a project is evaluated with respect to user benefits, cost, and economic potential.

Table 4

Environmental Considerations		
Physical Soils and Geology	Social/Cultural Environmental	Economic Environmental
Air Quality	Housing	Businesses
Water Resources	Neighborhoods	Employment
Soils and Geology	Noise	Economic Development
Wildlife	Educational Facilities	Public Utilities
Vegetation	Churches	Transportation Costs
	Parks and Recreational Facilities	Capital Costs
	Public Health and Safety	Operation and Maintenance Costs
	National Defense	
	Aesthetics	

However, thirteen environmental factors are generally not considered in these evaluations. They are the environmental impacts of a project on (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) park and recreation facilities, (11) historic sites and landmarks, (12) public health and safety, and (13) aesthetics. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project. The evaluation of the recommended improvements to the Hertford/Winfall street system based on (1) user benefits, (2) costs, (3) Probability that a project will stimulate economic development, (4) quantification of environmental impacts, and (5) relationship of a project to Intrastate Highway System provide a basis for evaluating how well projects meets these objectives is shown in Table 5.

TABLE 5

Hertford/Winfall Thoroughfare Plan Cost Estimates-Benefits-and Probable Impact						
DESCRIPTION	ROW COST \$1000	CONST. COST \$1000	USER BENEFITS \$1000	ECONOMIC DEVELOPMENT	ENVIRONMENTAL IMPACTS POSITIVE	NEGATIVE
US 17 Bypass	6,365	21,300	113,900	1.0	.4	.1
US 17 Business (Stabilize Causeway)	-	7,890	8,750	.7	.2	.1
NC 37 Proposal (US 17 to Winfall)	200	1,428	400	.6	.3	.3
NC 37/US 17 Business (Intersection Align.)	30	300	200	.4	.2	.2
US 17 B/US 17 Bypass (Intersection Align.)	35	300	200	.3	.4	.3
Extension of River St.	38	2,376	7,800	.8	.3	.2
SR 1107/SR 1108 (Realign curve & Inter)	10	300	350	.2	.5	.4
US 17Bus/Byp Intersect. Improvement	-	500	200	.4	.5	.3
Extension of SR 1121	62	2,798	9,500	.7	.5	.2
NC 37 Existing/SR 1219 (Intersect. Imp.-Win)	15	500	1,150	.3	.6	.4
Church Street/Bridge (Castleton Creek)	-	250	350	.5	.5	.2
NOTE: AMOUNTS ARE IN \$ X 1000						

The characteristic feature of the zoning ordinance that distinguishes it from most other regulations is that it differs from district to district, rather than being uniform throughout a city. Thus, a given area might be restricted to single-family residential development with minimum lot size requirements and setback provisions appropriate for development. In other areas, commercial or industrial development might be permitted, and regulations would be enacted to control such development. Building code provisions or sanitary regulations, on the other hand, normally apply to all buildings in a certain category regardless of where they may be situated within a city.

The zoning ordinance does not regulate the design of streets, utility installation, the reservation or dedication of parks, street rights-of-way, school sites, and related matters. These are controlled by subdivision regulations or possibly by use of an official map. The zoning ordinance should, however, be carefully coordinated with these and other control devices.

Official Maps

The roadway corridor official map (or official map) map is a document, adopted by the legislative body of the community, that pinpoints and preserves the location of proposed streets against encroachment. In effect, the official map serves notice on developers that the State or municipality intends to acquire certain specific property. The official map serves as a positive influence for sound development by reserving sites for public improvements in anticipation of actual need. The Eighth Street Extension and the Williams Street Extension are examples of proposed projects that could be protected by using an official map.

The NCDOT position is that it will limit the use of official maps to large scale, fully access controlled facilities planned for rapidly developing areas outside of municipal jurisdictions. For projects within municipal jurisdictions, official maps should be prepared and adopted by the local government. Municipalities may adopt official maps that extend beyond its extraterritorial jurisdiction with approval from the Board of County Commissioners.

It should be recognized that an official map places severe but temporary restrictions on private property rights. These restrictions are in the form of a prohibition, for up to three years, on the issuance of building permits or the approval of subdivisions on property lying within an official map alignment. The three year reservation period begins with the request for development approval. This authority should be used carefully and only in cases where less restrictive powers are found to be ineffective.

Requests for NCDOT to prepare and adopt an official map should be directed to the manager of the Program and Policy Branch. For cities contemplating the adoption of an official map, there are two ways in which the city may proceed. The first is to consider the official map statute as a stand-alone authority and use it as the basis for local adoption of an official map. Alternatively, the second approach is to adopt a local ordinance modeled after the statute, but modified to fit local circumstances and clarify the statute. Regardless of the approach taken, several procedural steps will need to be considered, such as establishing procedures for consideration of variance petitions.

Once the project has been selected and the alignment determined, maps must be prepared that are suitable for filing with the county Register of Deeds Office. The map should show the proposed alignment in sufficient detail to identify the functional design and the preliminary right-of-way boundaries. Since the purpose of the map is to show the effect on properties along the project path, the existing property boundaries should be identified. As an additional requirement, within one year of the adoption of an official map, work must begin on an environmental impact study or preliminary engineering.

It is important to recognize the risks inherent in the adoption of an official map prior to completing the environmental studies. Projects to be funded using any federal funds require the unbiased evaluation of alternative alignments. This means that other alternatives will be studied and compared to the protected alignment. ³

The above information is only to serve as an introduction to official maps, and in no way provides the information necessary to begin development of an official map. The Program and Policy Branch of the North Carolina Department of Transportation is responsible for facilitating the adoption of Official Street Maps. Cities considering Official Street Map projects should contact this Branch for their "Guidelines for Municipalities Considering Adoption of Roadway Corridor Official Maps" at:

Programming and Policy Branch
NC Department of Transportation
P.O. Box 25201
Raleigh, North Carolina 27611

³ "Guidelines for Municipalities Considering Adoption of Roadway Corridor Official Maps", prepared by NCDOT Program and Policy Branch.

Urban Renewal

Urban renewal plays a minor role in the transportation planning implementation process in terms of scope and general influence. However, under the right circumstances, renewal programs can make significant contributions. Provisions of the New Housing Act of 1974 (as amended) call for the conservation of good areas, rehabilitation of declining areas, and clearance of slum areas. In the course of renewal, it is important to coordinate with the Thoroughfare Plan to see if additional set-backs or dedication of rights-of-way are needed.

Continued use of urban renewal programs to improve the transportation system is encouraged. Changes that can be made under this program are generally not controversial or disruptive given the trauma of the clearance of a significant area.

Capital Improvement Programs

Capital programs are simply the coordination of planning and money. The capital improvements program, with respect to transportation, is a long range plan for the spending of money on street improvements, acquisition of rights-of-way and other improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements which are a municipal responsibility, right-of-way cost sharing on facilities designated a Division of Highways responsibility and advance purchase of right-of-way where such action is warranted.

Historically cities and towns have depended, to a great degree, on Federal or State funding to solve their transportation problems. Chapter 136-Article 3A of the Road and Highway Laws of North Carolina clearly outlines the responsibilities and obligations of the various governmental bodies regarding highway improvements. North Carolina Highway Bill 1211, passed in 1988, limits the role of municipalities to specific limits in right-of-way cost sharing. Set-back regulations, right-of-way dedications and reservations play a major role in the ultimate cost of many facilities. Only in special cases will the municipality be able to enjoy the benefits of highway improvement without a some form of investment.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the North Carolina Department of Transportation prior to access being allowed. Any development expected to generate large volumes of traffic (ie. shopping centers, fast food restaurants, large industries, etc.) may be comprehensively studied by staff from the Traffic Engineering, Planning and Research, and Roadway Design Branches of NC DOT. If

done at an early stage, it is often possible to significantly improve the development's accessibility at minimal expense. Since the municipality is the first point of contact for developers, it is important that the municipality advise them of this review requirement and cooperate in the review process.

Other Funding Sources

1. Assess user impact fees to fund transportation projects. These fees, called "facility fees" in the legislation, are to be based upon "reasonable and uniform considerations of capital costs to be incurred by the town as a result of new construction. The facility fee must bear a direct relationship to additional or expanded public capital costs of the community service facilities to be rendered for the inhabitants, occupants of the new construction, or those associated with the development process".
2. Enact a bond issue to fund street improvements.
3. Continue to work with NCDOT to have local projects included in the Transportation Improvement Program (TIP).
4. Consider the possibility of specific projects qualifying for federal demonstration project funds.
5. Adopt a collector street plan that would assess buyer or property owners for street improvement.
6. Charge a special assessment for utilities; for example, increase water and sewer bills to cover cost of street improvements.
7. Table 6, below, lists projects and implementation suggestions to develop the thoroughfare plan.

Procedures and Programs Recommended for Implementation of Projects

State Construction					City Programs and Ordinances							
Project	Rural Primary System	Urban System	Bridge Replacement	Second. Roads	Const.	Redev.	Block Grants	Bond	Subdiv. Ord.	Zoning Ord.	Future Street Lines	Adv. ROW Purchase
US 17 Bypass	X								X	X		
US 17 Business Stabilize Causeway		X	X						X	X		
NC 37 Proposed	X								X	X		
NC 37/US 17 B. Intersect Align	X								X	X		
US 17 B/US 17By Intersect Align	X								X	X		
Ext. River St.				X	X				X		X	X
SR 1107/SR 1108 Realign curve/Ints				X								
US 17 Bus/Byp Intersect Improv	X											
Ext. SR 1121				X	X				X		X	X
NC 37 Exist/SR 1219 Intersect Imp-Winfa	X			X		X						
Church St/Bridge Castleton Creek			X	X								

APPENDIX A

Typical Cross Sections

Typical cross sections recommended by the Thoroughfare Planning Unit are shown in Appendix A, Figure 7, and listed in Appendix A, Table 7.

Cross section "A" is illustrative for controlled access freeways. The 46 foot grassed median is the least desirable median width, but there could be some variation from this depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas which may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", seven lane urban, and cross section "D", five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and "F" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical cross section "H" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "I". Cross section "J" and "K" are usually recommended for minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "J" would be used on those minor thoroughfares where parking on both sides is needed as a result of more concentrated development.

Cross section "L" is used in rural areas or for staged construction of a wider multilane cross section. On some thoroughfares projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter urban cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk further away from the street to provide added separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Rights-of-way shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle traffic along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to allow for the bicycle facilities. The North Carolina Bicycle Facility and Program Handbook should be consulted for design standards for bicycle facilities.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service and available right-of-way.

TYPICAL THOROUGHFARE CROSS SECTIONS

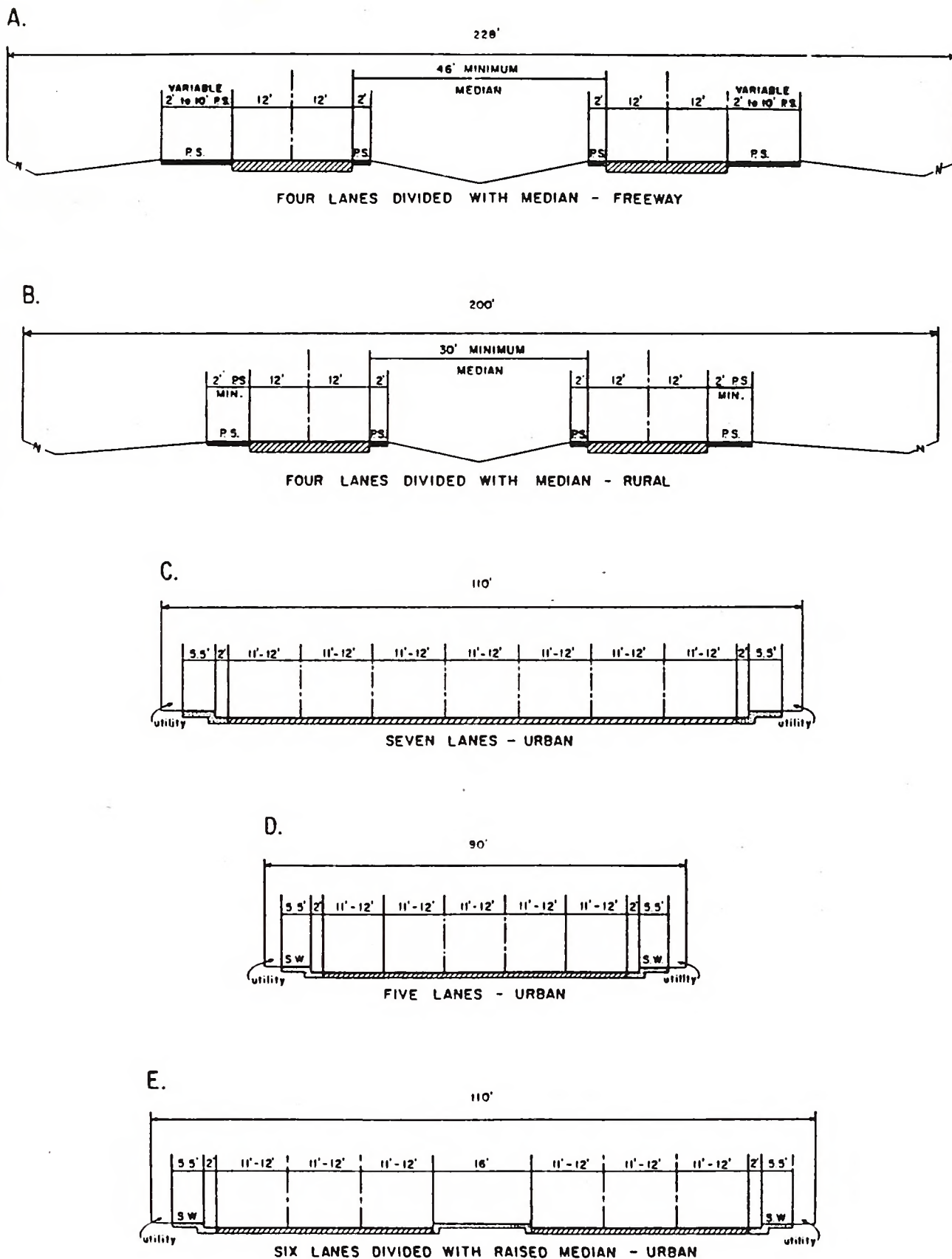
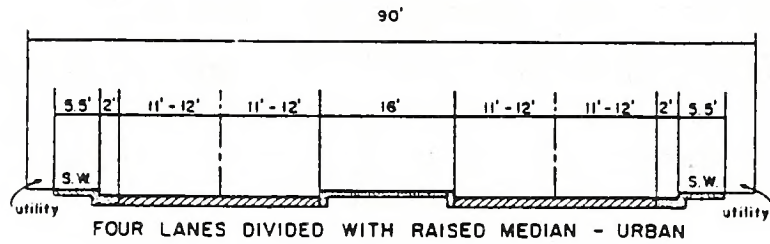


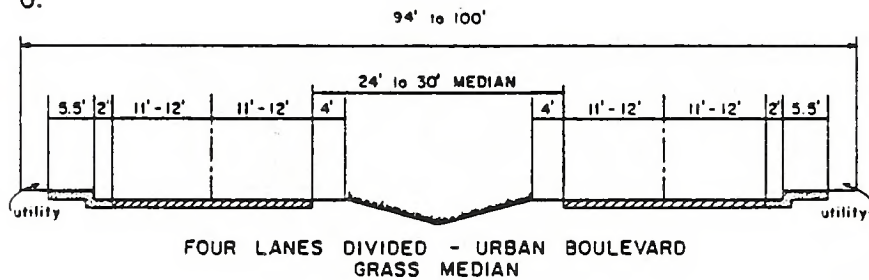
FIGURE 7

TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)

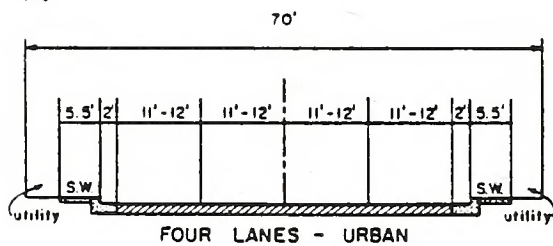
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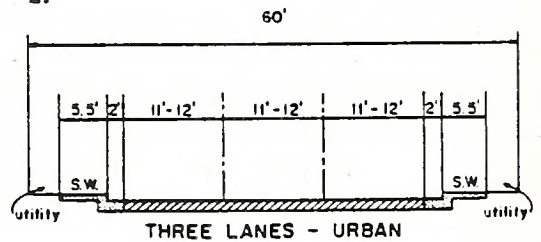
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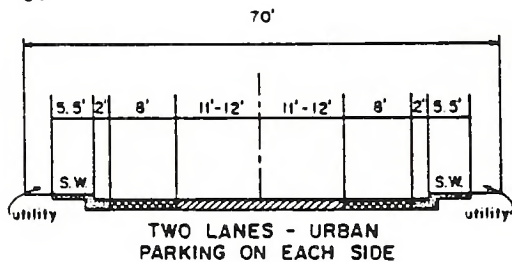
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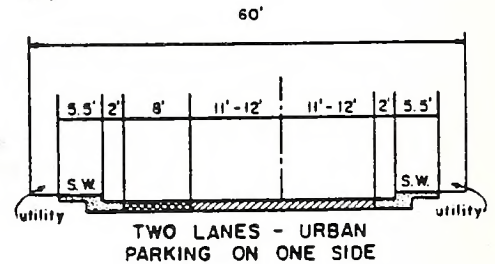
I.



J.



K.



L.

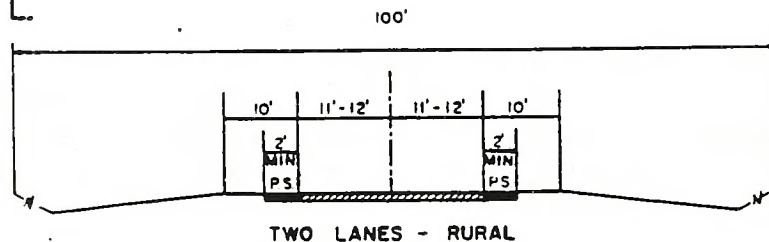


TABLE 7
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X-SECTION			CAPACITY CURRENT (FUTURE)	VOLUMES ADT		RECOMMENDED X-SECTION	
	DIST MI	RDWY FT	ROW FT		1990	2015	RDWY (ULT)	ROW (ULT)
US 17 Bypass	3.72	24	200	(33,500)	12600	27000	48	ADQ
US 17 Business								
US 17 Byp to SR 1354	.23	22	100	6,450	2,600	4,500	L	ADQ
SR 1354 to King St	.83	44	100	18,000	3,000	5,000	ADQ	ADQ
King St to Market St	.15	28	100	8,000	3,500	5,000	H	ADQ
Edenton to Church St	.42	42	100	15,000	3,500	5,000	H	ADQ
Market to Grubb	.15	44	100	18,000	4,000	6,000	ADQ	ADQ
Grubb to Bridge	.22	22	100	6,450	3,000	5,000	K	ADQ
Bridge to US 17 Byp N	1.35	22	100	6,450	3,000	5,000	L	ADQ
Extension to US 17 Byp	.15	--	---	(6,450)	-----	5,000	L	100
NC 37 (Existing)								
US 17B Connection	.12	--	---	(7,500)	-----	4,500	L	100
Connector to Winfall	1.30	24	60	7,500	2,600	4,500	ADQ	ADQ
Catherine to SR 1120	1.44	24	60	7,500	2,000	4,000	ADQ	ADQ
NC 37 Proposed Extension								
US 17 Byp to Winfall	1.52	--	--	(7,500)	-----	3,500	L	100
SR 1107/SR 1338								
SR 1110 to SR 1108	1.14	20	60	4,500	500	1,000	L	ADQ
SR 1108 Realignment	.12	--	--	(7,500)	---	1,000	L	100
SR 1108 to US 17 Byp	1.97	20	60	4,500	600	1,000	L	ADQ
US 17 Byp to SR 1337	1.36	20	60	4,500	600	1,000	L	ADQ
SR 1336 (Church St)								
SR 1337 to US 17 Byp	1.60	18	60	4,200	400	1,000	L	ADQ
US 17 Byp to Dobb St	.76	36	60	12,000	3,800	6,000	ADQ	ADQ
SR 1110/Grubb Street								
SR 1107 to Edenton ST	2.12	20	60	4,500	1,200	2,600	L	ADQ
Edenton to Church	.45	34	60	8,000	3,300	6,500	K	ADQ
SR 1337 (Skinner St)								
SR 1336 to SR 1338	.50	20	60	4,500	200	500	L	ADQ
SR 1108								
SR 1107 to SR 1110	.68	20	60	4,500	200	350	L	ADQ
Dobb St/Carolina Ave								
Grubb St to Edenton St	.57	18	60	3,000	500	800	K	ADQ

ADQ - ADEQUATE
NA - NOT AVAILABLE

TABLE 7 (continued)
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

FACILITY & SECTION	EXISTING X-SECTION			CAPACITY CURRENT (FUTURE)	VOLUMES ADT		RECOMMENDED X-SECTION	
	DIST MI	RDWY FT	ROW FT		1990	2015	RDWY (ULT)	ROW (ULT)
Market Street Edenton to Church St	.53	26	50	8,000	2,500	4,000	K	ADQ
King Street Edenton to Church St	.53	28	50	8,000	1,500	3,000	K	ADQ
Don Juan Rd (SR 1109) Rivewood to Wright Far	.30	--	--	-----	-----	-----	L	100
Wright Farm to SR 1110	.45	20	60	4,500	600	1,800	L	ADQ
Connector to SR 1110	.12	--	--	-----	-----	1,800	L	100
SR 1121/Riverwood Ext NC 37 to End of Pave	.91	18	60	3,000	100	1,500	L	ADQ
End of Pave to SR 1110	1.52	--	--	-----	---	1,500	L	100
River St and Extension NC 37 to Belvedere St	.30	18	60	3,000	200	500	K	ADQ
Belvedere to SR 1110	1.89	--	--	4,000	---	---	L	100
King St (Winfall) NC 37 to Desert Rd	.42	20	60	4,500	200	500	K	ADQ
SR 1219 NC 37 to SR 1221	1.00	20	60	4,500	200	400	L	ADQ
SR 1220 SR 1219 to US 17 Byp	1.67	20	60	4,500	200	600	L	ADQ
Connector to US 17 Byp	.10	--	--	-----	---	600	L	100
SR 1300 US 17 Byp to SR 1301	.91	20	60	4,500	200	400	L	ADQ
SR 1301/SR 1227 SR 1391 to Plann Bdry	2.12	20	60	4,500	150	300	L	ADQ
SR 1214 (Lake Road) SR 1220 to SR 1219	.90	up	60	1,000	100	400	L	ADQ
SR 1219 to SR 1221	.76	20	60	4,500	150	400	L	ADQ
SR 1216 (Desert Road) NC 37 to N. Pln Bdry	.83	20	60	4,500	300	700	L	ADQ

ADQ - ADEQUATE
NA - NOT AVAILABLE

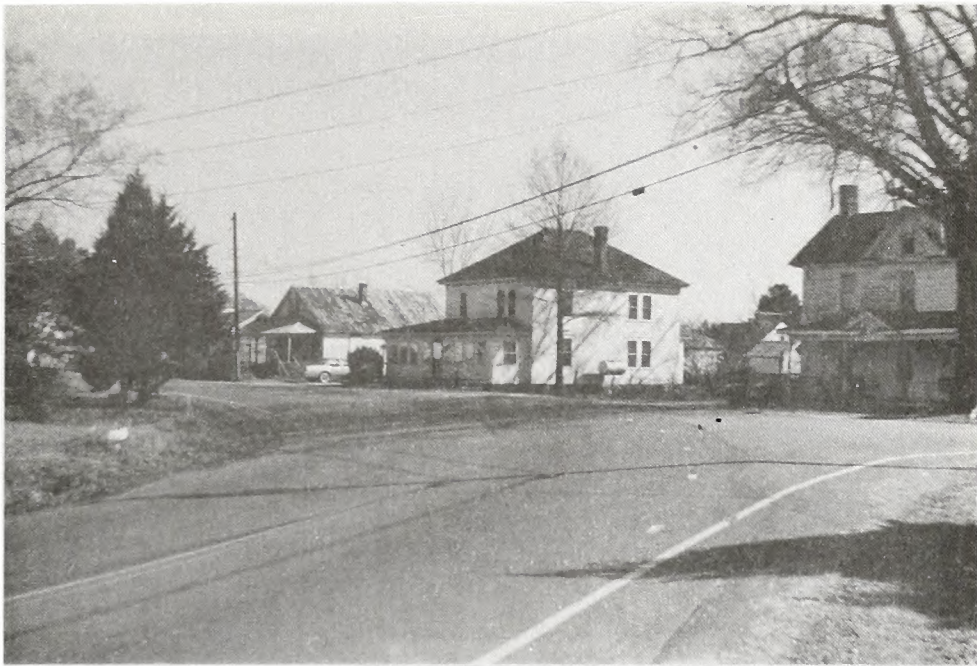
PHOTO LOG OF SELECTED NEEDS



PERQUIMANNS RIVER BRIDGE/CHURCH STREET



CAUSEWAY/US 17 BUSINESS



NC 37 AT BELVIDERE STREET



RIVER STREET EXTENSION



CATHERINE STREET AT RAILROAD CROSSING



RAILROAD STREET



EDENTON ROAD AT MARKET STREET



PUNCH ALLEY AT GRUBB STREET

APPENDIX B

RECOMMENDED SUBDIVISION ORDINANCES

DEFINITIONS

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. Minor Arterial - A rural roadway joining cities and larger towns and providing intrastate and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
3. Major Collector - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
4. Minor Collector - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.
5. Local Road - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, Intrastate, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
2. Minor Thoroughfares - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.
3. Local Street - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

C. Specific Type Rural or Urban Streets

1. Freeway - Divided multilane highways designed to carry large volumes of traffic at higher speeds. A freeway provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. (Design speed 70 mph, Operating speed 55 mph to 65 mph)
2. Secondary Freeway - A divided multilane roadway designed to carry moderate volumes of traffic at moderate speeds. The facility provides for the continuous flow of traffic through full control of access and the provision of interchanges or grade separation with no access at cross roads, and no traffic signals. (Design speed 50-55 mph, Operating speed 40-45 mph)
3. Parkway - A divided multilane roadway for noncommercial traffic, with full or partial control of access. Grade separations are provided at major intersections and there are no traffic signals.
4. Expressway - A divided multilane roadway designed to carry heavy volumes of traffic with full or partial control of access. Interchanges are provided at major intersections. There may be access to service roads and local streets, but there will be no signalized intersections.
5. Secondary Expressway - A divided multilane roadway designed to carry moderate volumes of traffic at moderate speeds. This facility may have partial control of access with right turn in and right turn out access to abutting property, and interchanges at major intersections. Some minor intersections may have traffic signal control.
6. Urban Arterial - Multilane roadway with signalized intersections, and access to abutting property. May have grass or barrier type median, or middle left turn lane.
7. Residential Collector Street - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
8. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
9. Cul-de-sac - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.

10. Frontage Road - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.

11. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.

B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved, (3) widening or opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

D. Reservation - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

DESIGN STANDARDS

I. Streets and Roads

The design of all roads within Hertford and Winfall shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the Towns of Hertford and Winfall.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

- A. Right-of-way Widths - Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out the Thoroughfare Plan.

	Min. ROW
1. Rural	
a. Principle Arterial	
Freeways	350 ft.
Other	200 ft.
b. Minor Arterial	100 ft.
c. Major Collector	100 ft.
d. Minor Collector	80 ft.
e. Local Road	60 ft.*
2. Urban	
a. Major Thoroughfare other than Freeway and Expressway	90 ft.
b. Minor Thoroughfare	70 ft.
c. Local Street	60 ft.*
d. Cul-de-sac	Variable**

* The desirable minimum right-of-way (ROW) is 60 ft. If curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

** The ROW dimension will depend on radius used for vehicular turnaround. Distance from edge of pavement of turnaround to ROW should not be less than distance from edge of pavement to ROW on street approaching turnaround.

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than sixty feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths - Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential

Curb and Gutter section: 26 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 4 foot
shoulders

2. Residential Collector

Curb and Gutter section: 34 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 6 foot
shoulders

C. Geometric Characteristics - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed - The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets shall be:

Design Speeds			
Facility Type	Desirable	Design Speed	
		Level	Minimum Rolling
Rural			
Minor Collector Roads	60	50	40
Local roads including Residential Collector and Local Residential	50	50*	40*
Urban			
Major thoroughfares other than Freeways, Expressways, or Parkways	60	50	50
Minor Thoroughfares	60	50	40
Local Streets	40	40*	30**

- * Based on projected annual average daily traffic of 400-750. In cases where road will serve a limited area and small number of dwelling units, minimum design speeds can be reduced further.
- * Based on projected annual average daily traffic of 50-250.

2. Maximum and Minimum Grades

- a. The maximum grades in percent shall be:

MAXIMUM VERTICAL GRADE		
Design Speed	Terrain	
	Level	Rolling
60	4	5
50	5	6
40	6	7
30		9

- b. Minimum grade should not be less than 0.5% .
- c. Grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5%.
- d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% of the value in the above table.

3. Minimum Sight Distance - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

Sight Distances				
Design Speed	30	40	50	60
Stopping Sight Distance				
Minimum (ft.)	200	275	400	525
Desirable Minimum (ft.)	200	325	475	650
Minimum K* Value for:				
Crest Curve	30	80	160	310
Sag Curve	40	70	110	160

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)

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- * K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide the desired sight distance.

Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1984".

4. The "Superelevation Table" below shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter of 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

Superelevation Table			
Design Speed	Maximum e*	Minimum Radius ft.	Max. Deg. of Curve
30	0.04	302	19 00'
40	0.04	573	10 00'
50	0.04	955	6 00'
60	0.04	1,528	3 45'
30	0.06	273	21 00'
40	0.06	509	11 15'
50	0.06	849	6 45'
60	0.06	1,380	4 15'
30	0.08	252	22 45'
40	0.08	468	12 15'
50	0.08	764	7 30'
60	0.08	1,206	4 45'

* e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees. No street should intersect a railroad at grade at an angle less than (65) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least twenty (20) feet.
3. Deadend alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turnaround facilities at the deadend as may be required by the Planning Board.

F. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

G. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

H. Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

I. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

- a. Shoulder section approach

- i. Under 800 ADT design year

Minimum 28 feet width face to face of parapets of rails or pavement width plus 10 feet, whichever is greater.

ii. 800 - 2000 ADT design year

Minimum 34 feet width face to face of parapets of rails or pavement width plus 12 feet, whichever is greater.

iii. Over 2000 ADT design year

Minimum width of 40 feet, desirable width of 44 feet width face to face of parapets or rails.

b. Curbs and gutter approach

i. Under 800 ADT design year

Minimum 24 feet face to face of curbs.

ii. Over 800 ADT design year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

a. Shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (Shoulder width 8' minimum, 10' desirable.)

b. Curb and gutter approach - Width of approach pavement measured face to face of curbs.

